



Consolidated Program for Research and Development for Welding of High Strength Steel Pipelines, #277 & 278

PUBLIC PAGE

QUARTERLY REPORT

Project WP#277: Update of Weld Design, Testing, and Assessment Procedures for High Strength Pipelines

For Period Ending: February 28, 2010

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Background

High strength pipelines are expected to become a major player in long distance onshore hydrocarbon transportation. Understanding the differences between the modern high strength and older-generation linepipes is critical to the safe and economical application of those modern materials. The objectives of this project to fill the critical gaps and provide guidelines on the effective use of high strength linepipes, from design and testing to weld integrity assessment procedures. The interdependence of linepipe materials, welding processes, design requirements, and weld integrity are being investigated to enable realistic and effective use of high strength linepipes.

Progress in the Quarter

The teams from CRES, CANMET, LEC, and NIST completed the following activities in the tenth quarter of this project:

1. Continued development of weld metal tensile and toughness testing protocols
2. Completed more curved wide plate (CWP) tests for a total of seven specimens so far.
3. Development of fatigue pre-cracking fixture for CWP specimens
4. Development and validation of load and compliance of the fatigue pre-cracking fixture
5. Post-test analysis of CWP data and determination of tensile strain capacity
6. Communication of project progress with standards committees.

Work is under way to address all weld metal tensile test methods using a range of specimen geometries, including standard round bars, full-strip and split-strip tensile specimens. The team has investigated the effect of different side-groove depths on crack growth using fatigue pre-cracked low-constraint SE(T) samples. They determined that the effectiveness of the side groove on producing uniform crack growth depends on both side groove depth and the initial crack depth. A side-groove depth of 15% (total) was found to produce growth with acceptably straight crack fronts. More curved wide plate specimens are being prepared for testing. The team continues to hold joint web-conferences every two weeks.

The results of this project are being applied to the revision of API 1104 Appendix A which is becoming widely used in the new pipeline construction projects. The project team is preparing several papers from this project for publication at the International Pipeline Conference.